Amendments to the Claims:

A clean version of the entire set of pending claims (including amendments to the claims, if any) is submitted herewith per 37 CFR 1.121(c)(3). This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1-14. (Cancelled)

15. (Currently Amended) A method ~~for determining the presence of at least one magnetic particle (15), the method comprising the steps of~~ comprising:

- using a magnetic field generator disposed on a substrate to generate ~~generating~~ an [[ac]]AC magnetic field ~~in the vicinity of a magnetic sensor element (11)~~,

- sensing with ~~the~~ a magnetic sensor element also disposed on the substrate a magnetic property of ~~the~~ at least one magnetic particle ~~(15)~~ which magnetic property is related to the [[ac]]AC magnetic field, ~~characterized in that the~~wherein a frequency of the [[ac]]AC magnetic field is ~~chosen~~ at least 100 Hz ~~or above~~.

16. (Currently Amended) [[A]] The method ~~as claimed in~~ of claim 15, ~~characterized in that~~ wherein the frequency ~~is chosen at~~ has a value ~~where the~~such that thermal white (Nyquist) noise of the magnetic sensor element ~~(11)~~ is dominant over ~~the~~ 1/f noise of the magnetic sensor element ~~(11)~~.

17. (Currently Amended) [[A]] The method ~~as claimed in~~ of claim 15, ~~characterized in that~~ wherein an amplifier ~~(21)~~ is connected to the magnetic sensor element ~~(11)~~ and the frequency of the [[ac]]AC magnetic field ~~is chosen at~~ has a value ~~where the such that~~ thermal white noise at the output of the amplifier ~~(21)~~ is dominant over ~~the~~ 1/f noise at the output of the amplifier ~~(21)~~.

18. (Currently Amended) [[A]] The method ~~as claimed in~~ of claim 15, ~~characterized in that the~~wherein a direction ~~(30)~~ of the generated [[ac]]AC magnetic field is mainly perpendicular to ~~the~~ a plane of the magnetic sensor element in ~~the direct neighborhood~~ an immediate vicinity of the magnetic sensor element.

19. (Currently Amended) [[A]] The method ~~as claimed in~~ of claim 15, further comprising ~~the steps of~~:

- performing a calibrating measurement ~~in absence of magnetic particles (15), which calibrating measurement measures~~ by employing the magnetic sensor element to measure a calibration value corresponding to the AC magnetic field generated by the magnetic field generator in an absence of magnetic particles; ~~(12).~~

- ~~using the obtained calibrating measurement value and subtract that value from the actual measurement value obtained when~~ subtracting the calibration value from a measurement ~~is carried out~~ by the magnetic sensor element of the AC magnetic field generated by the magnetic field generator in the presence of the at least one magnetic ~~particles (15)~~ particle.

20-23. (Canceled)

24. (New) The method of claim 15, further comprising:

detecting a binding reaction of a target sample with a binding site disposed on the substrate, wherein the binding reaction brings the at least one magnetic particle into a vicinity of the magnetic sensor element and the magnetic sensor element detects the binding reaction by detecting the presence of the at least one magnetic particle.

25. (New) The method of claim 24, wherein the target sample is one of a biological sample and a chemical sample.

26. (New) The method of claim 15, wherein the substrate is a semiconductor substrate.

27. (New) The method of claim 15, wherein the substrate is a glass substrate.

28. (New) A method, comprising:

generating a first AC magnetic field having a first frequency;

generating a second AC magnetic field having a second frequency different from the first frequency, wherein each of the first and second frequencies is at least 100 Hz;

sensing with a magnetic sensor element a magnetic property of one or more magnetic particles which magnetic property is related to the first and second AC magnetic fields; and

demodulating an output signal of the magnetic sensor element to produce two detection signals corresponding to the first and second AC magnetic fields; and

processing the two detection signals to determine a number of the one or more magnetic particles, and corresponding positions of said one or more magnetic particles.

29. (New) The method of claim 28, wherein first and second AC magnetic fields are each mainly perpendicular to a plane of the magnetic sensor element in an immediate vicinity of the magnetic sensor element.

30. (New) The method of claim 28, where the first and second AC magnetic fields are generated by corresponding first and second AC magnetic field generators each disposed on a same substrate.

31. (New) The method of claim 30, wherein at least portions of the first and second AC magnetic field generators lie is a same plane as each other.

32. (New) The method of claim 31, wherein the magnetic sensor element is also disposed on the substrate, at least a portion of the magnetic sensor element lying in the same plane as the portions of the first and second AC magnetic field generators.

33. (New) The method of claim 30, wherein the magnetic sensor element is also disposed on the substrate.

34. (New) The method of claim 33 further comprising:

detecting one or more binding reactions of one or more target samples with one or more binding sites disposed on the substrate, wherein the one or more binding reactions bring the one of more magnetic particles into a vicinity of the magnetic sensor element and the magnetic sensor element detects the one or more binding reactions by determining the number of the one or more magnetic particles.

35. (New) The method of claim 34, wherein the target sample is one of a biological sample and a chemical sample.

36. (New) The method of claim 28 further comprising:

detecting one or more binding reactions of one or more target samples with one or more binding sites, wherein the one or more binding reactions bring the one of more magnetic particles into a vicinity of the magnetic sensor element and the magnetic sensor element detects the one or more binding reactions by determining the number of the one or more magnetic particles.

37. (New) The method of claim 36, wherein the target sample is one of a biological sample and a chemical sample.